

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
 Organization
 International Bureau



10/532886



(43) International Publication Date
 18 March 2004 (18.03.2004)

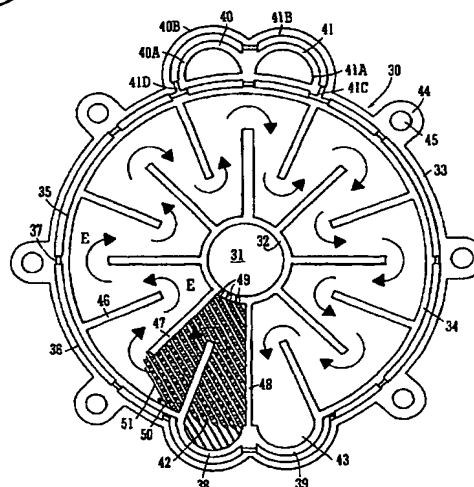
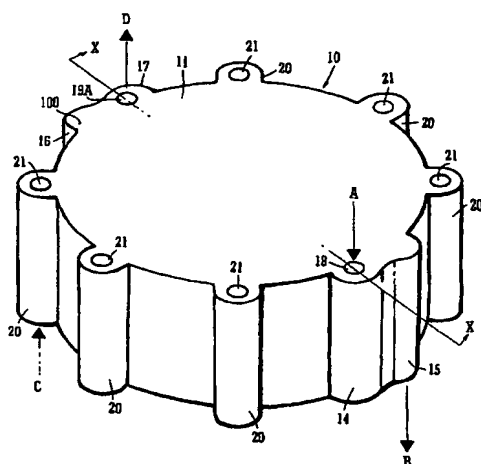
PCT

(10) International Publication Number
 WO 2004/023055 A1

- (51) International Patent Classification⁷: F28D 9/00 (74) Agent: LAURENCE SHAW & ASSOCIATES LIMITED; 1 Hagley Road, Edgbaston, Birmingham B16 8TG (GB).
- (21) International Application Number: PCT/GB2003/003848
- (22) International Filing Date: 5 September 2003 (05.09.2003)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data: 0220652.2 5 September 2002 (05.09.2002) GB
- (71) Applicant (for all designated States except US): CHART HEAT EXCHANGERS LIMITED PARTNERSHIP [GB/GB]; Wobaston Road, Fordhouses, Wolverhampton WV10 6QB (GB).
- (72) Inventor; and
- (75) Inventor/Applicant (for US only): SYMONDS, Keith, Thomas [GB/GB]; 4 Lansdowne Avenue, Codsall, Wolverhampton WV8 2EN (GB).
- (81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).
- Published:
 — with international search report
 — before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

[Continued on next page]

(54) Title: HEAT EXCHANGER AND/OR CHEMICAL REACTOR



(57) Abstract: Heat exchange and/or chemical reactor apparatus (10; 100) comprises a series of plates which are stacked and bonded together in a fluid-tight manner, the series of plates comprising alternate first (30; 130) and second (90; 190) plates or groups of plates along the stack providing flow paths for respective first and second fluids, each plate forming said first (30; 130) and second (90; 190) plates or groups of plates having an inlet (42, 90) and an outlet (43, 91) between which respective first or second fluid is flowable and a continuous wall (34, 84) to contain the flow of fluid, and characterised in that each plate (30, 90; 130; 190) comprises an outer wall (43, 83) continuous wall (34, 84) to define a space (35, 85) therebetween, the spaces (35, 85) of each plate (30, 90; 130; 190) of the stack being in fluid communication to form a compartment running along the stack.

WO 2004/023055 A1



For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

INTERNATIONAL SEARCH REPORT

Application No
PCT/GB 03/03848

A. CLASSIFICATION OF SUBJECT MATTER IPC 7 F28D9/00		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) IPC 7 F28D		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practical, search terms used) EPO-Internal		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P, A	WO 02 101313 A (CHART HEAT EXCHANGERS LTD ; SYMONDS KEITH THOMAS (GB)) 19 December 2002 (2002-12-19) cited in the application the whole document	1-29
A	GB 1 405 976 A (PRZED DOSWIADCZALNE PRZEMYSLOW) 10 September 1975 (1975-09-10) the whole document	1-29
<input type="checkbox"/> Further documents are listed in the continuation of box C. <input checked="" type="checkbox"/> Patent family members are listed in annex.		
* Special categories of cited documents : "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. "&" document member of the same patent family		
Date of the actual completion of the international search 11 February 2004		Date of mailing of the international search report 18/02/2004
Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016		Authorized officer Mellado Ramirez, J

INTERNATIONAL SEARCH REPORT

Information on patent family members

Inventor
Application No
PCT/GB 03/03848

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 02101313	A	19-12-2002	WO 02101313 A1	19-12-2002
GB 1405976	A	10-09-1975	PL 84062 B1	28-02-1976
			CS 166205 B2	27-02-1976
			DD 106697 A5	20-06-1974
			DE 2335784 A1	24-01-1974
			FR 2193189 A1	15-02-1974
			RO 68190 A1	26-02-1982